Lightweight, Composite Cryogenic Tank Structures, Phase I

Completed Technology Project (2007 - 2007)

Project Introduction

Microcosm has developed and qualified strong, all-composite LOX tanks for launch vehicles. Our new 42-inch diameter tank design weighs 486 lbs and burst without leaking at 2,125 psi, within 3.5% of the predicted burst pressure. This SBIR will analyze, design, build, and test much lighter weight all composite cryogenic tanks and examine, develop, and test alternative insulation techniques to minimize boil-off. This SBIR will also examine the reuse of propellant tanks as crew and storage habitats. During Phase I, we will design and fabricate 12 10-inch diameter and 2 25-inch diameter cryogenic tanks with a design burst pressure of approximately 850 psi. Eight of the 10-inch tanks and one 25-inch tank will be thermally cycled and burst tested using liquid nitrogen to obtain statistical data. The remaining 4 10-inch tanks will first be thermally cycled, then flushed out and re-pressurized with gaseous helium to simulate reuse as a crew habitat. The remaining 25-inch tank will be delivered to NASA for further testing. Phase II will fabricate, build, and test larger tanks and tanks specifically intended to meet the needs of future NASA programs, and alternative insulation approaches will be evaluated to minimize boil-off.

Primary U.S. Work Locations and Key Partners

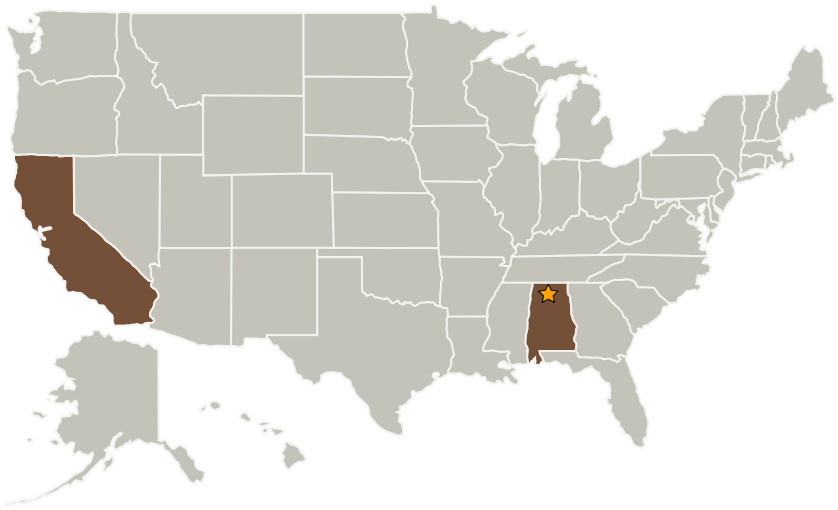

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Table of Contents

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Marshall Space Flight Center (MSFC)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

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Organizations Performing Work	Role	Type	Location
★Marshall Space Flight Center(MSFC)	Lead Organization	NASA Center	Huntsville, Alabama
Microcosm, Inc.	Supporting Organization	Industry Women-Owned Small Business (WOSB)	Hawthorne, California

Primary U.S. Work Locations	
Alabama	California

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Technology Areas

Primary:

- TX14 Thermal Management Systems
  - TX14.1 Cryogenic Systems
    - TX14.1.2 Launch Vehicle Propellant